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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,188	06/16/2005	Nobuhiro Ito	14633.0008USWO	2230
52835 7590 02/10/2011 HAMRE, SCHUMANN, MUELLER & LARSON, P.C. P.O. BOX 2902 MINNEAPOLIS, MN 55402-0902				
EXAMINER				
COUGHLIN, MATTHEW P				
ART UNIT		PAPER NUMBER		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/539,188

**Applicant(s)**

ITO ET AL.

**Examiner**

Matthew P. Coughlin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 December 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3, 5-9 and 11-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-9 and 11-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Transposition of Patent Drawing Review (PTO-940)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

Claims 1-3, 5-9 and 11-17 are pending in the application. Claims 1-3, 5-9 and 11-17 are rejected.

***Priority***

This application is a 35 U.S.C. 371 National Stage Filing of International Application No. PCT/JP03/14182, filed November 7<sup>th</sup>, 2003, which claims priority under 35 U.S.C. 119(a-d) to Japanese Application No. 2002-378932, filed December 27<sup>th</sup>, 2002.

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Response to Amendment / Argument***

Beginning on page 7 of the response filed December 14<sup>th</sup>, 2010, Applicant traverses the rejection of claims 1-3, 5-9, 11 and 13-17 under 35 USC 103(a) as unpatentable over Garnett et al. {Catalytic deuterium exchange reactions with aromatics. VI. Platinum catalyst reproducibility and activation procedures, Journal of Catalysis (1963), 2(4), 339-347} in view of Kato et al. {U.S. Patent No. 5,221,768}. This rejection has been withdrawn in favor of the new 103 rejection below. Accordingly, Applicant's traversals will not be addressed.

Beginning on page 9 of the response filed December 14<sup>th</sup>, 2010, Applicant traverses the rejection of claim 12 under 35 USC 102(b) as anticipated by Cristol et al. {Bridged polycyclic compounds. XX. Cis stereochemistry of the addition of methanol and water to endo-trimethylenenorbornene, Tetrahedron Letters (1963) 185-189}. The rejection is withdrawn since claim 12 requires a

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deuteration ratio of 60% where the compounds of the reference have deuteration ratios of less than 10%.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-3, 5-9, 13-14 and 16-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-3, 5-9, 13-14 and 16-17 are indefinite since claim 1 recites the limitation "the carbon-carbon double bond and the triple bond" in line 18. There is insufficient antecedent basis for this limitation in the claim. The preceding text of claim recites more than one instance of a double bond and triple bond. It is unclear if this limitation refers to all instances or some but not others. The provision in lines 18-19 use singular language whereas the claims recite plural instances that could be affected by the provision.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5-9 and 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,874,890 by Kato et al. in view of Sajiki et al. Synlett. 2002, No. 7, 1149-1151 and in further view of Garnett et al. Aust. J. Chem. 1961, 14, 441-448 and in further view of Garnett et al., Journal of Catalysis, 1963, 2(4), 339-347 and in further view of U.S. Patent No. 4,591,626 by Kawai et al.

**Determining the scope and contents of the prior art. (See MPEP § 2141.01)**

Kato et al. teach methods for the production of deuterated methyl methacrylate in examples 4-6 by the treatment of methyl methacrylate with heavy water in the presence of a platinum, rhodium, palladium or ruthenium catalyst.

**Ascertainment of the differences between the prior art and the claims. (See MPEP § 2141.02)**

The differences between the claims and the prior art are that:

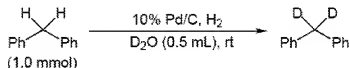
(1) the claims require that "when the compound represented by the general formula [1] has at least one carbon-carbon double bond and/or at least on tripe bond, the catalyst activated in advance is used as the activated catalyst;"

(2) the claims are drawn to the deuteration of analogous products and the products themselves in claims 3, 11, 12 and 15.

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**Finding of prima facie obviousness --- rationale and motivation (See MPEP § 2141.02)**

The instant claims require that "the catalyst activated in advance is used as the activated catalyst." Therefore, if the catalysts used by Kato et al. had been pre-treated with H<sub>2</sub>, the instant claims would be anticipated. The activation of hydrogen catalysts with hydrogen in deuteration reactions is well-known and well-documented in the art. Sajiki et al. teach the following deuteration reactions where (page 1149, right column) "hydrogen was found to dramatically activate the reactivity of the Pd-C-catalysed H-D exchange reaction":



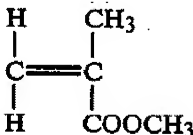
Entry	H <sub>2</sub>	Time (d)	D content (%) <sup>b</sup>
1	None <sup>c</sup>	1	0
2 (1 <sup>st</sup> run)	Balloon	1	66

In the reaction taught by Sajiki et al., the substrate lacked any double bonds that would be highly susceptible to reduction in the presence of hydrogen gas and Pd/C. Therefore, the fact that the palladium catalyst had not been pre-treated with hydrogen was of no consequence to the reaction.

Garnett et al. (1963) teach the important of activation of platinum catalysts in their study to (page 339) "develop improved methods of catalysts activation (reduction of platinum oxide), which would yield catalysts possessing suitable activity and high reproducibility." Garnett et al. (1961) teach procedures where metal catalysts are pre-treated with deuterium gas on page 443 (Experimental section) where the authors state "Deuterium oxide was used in preference to deuterium gas since the latter by simultaneous

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hydrogenation of the species complicates the identification of the deuterated products." Methyl methacrylate has the following structure:



Accordingly, a person having ordinary skill in the art would expect that if hydrogen or deuterium gas were added to the reaction system of Kato et al., the double bond of methyl methacrylate could be susceptible to reduction. With the motivation of activating the metal catalysts as taught by Sajiki et al. and Garnett et al. without risking hydrogenation of methyl methacrylate, a person having ordinary skill in the art would have been motivated to pre-treat the metal catalysts of Kato et al. with hydrogen or deuterium gas and then subsequently add the methyl methacrylate substrate to the system after removal of the hydrogen or deuterium gas source.

With respect to claims 3, 11, 12 and 15 which are drawn to the deuteration of products and deuterated products other than methyl methacrylate, the use of analogous reactants in a known process is *prima facie* obvious. *In re Durden*, 226 USPQ 359 (1985). Once the general reaction has been shown to be old, the burden is on Applicants to present reasons or authority for believing that a group on the starting material would take part in or affect the basic reaction and thus alter the nature of the product or the operability of the process. In the instant case, Sajiki et al. teach that under the instant conditions, benzylic positions can be deuterated at room temperature. Kato et al. teach that allylic and alkenyl positions can be deuterated without hydrogen or catalyst pre-activation at temperatures of 85

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- 120 °C. A person having ordinary skill in the art in modifying the procedure of Kato et al. to activate the catalyst by pre-treatment with hydrogen or deuterium gas would have been motivated to use the procedure on additional compounds with the reasonable expectation that deuteration could be obtained and modulated with increases or decreases in temperature for various types of substrates. A person having ordinary skill in the art in seeking to develop deuterated tricyclo[5.2.1.0<sup>2,6</sup>]decan-8-ol for use in optical elements (See U.S. Patent No. 4,591,626 by Kawai et al., abstract where polymers of tricyclo[5.2.1.0<sup>2,6</sup>]decan-8-yl methacrylate are useful for optical elements) would have been motivated to use the procedure of the prior art with catalyst pre-activation or in the presence of hydrogen or deuterium gas at elevated temperatures to obtain deuterated tricyclo[5.2.1.0<sup>2,6</sup>]decan-8-ol with a reasonable expectation of success.

In looking at the instant claimed process as a whole, as stated in In re Ochiai, 37 USPQ 2d 1127 (1995), the claimed process would have been suggested to one skilled in the art.

One skilled in the art would thus be motivated to utilize the process of the prior to arrive at the instant claimed process with the expectation of producing deuterated compounds. The instant claimed invention would have been suggested to one skilled in the art and therefore, the instant claimed invention would have been obvious to one skilled in the art.



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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew P. Coughlin whose telephone number is (571)270-1311. The examiner can normally be reached on Monday through Thursday from 12:00 pm - 8:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph McKane can be reached on 571-272-0699. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew P. Coughlin/  
Examiner, Art Unit 1626

/Joseph R Kosack/  
Primary Examiner, Art Unit 1626